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ABSTRACT

The problem beginning secondary school teachers face in bridging the knowledge gap between the subject discipline studied in college and the content that must be taught to high school students is analyzed in this study. To demonstrate this problem and follow the progressive steps taken to partially solve it, case studies are presented of two social science majors learning to become social studies teachers. This process required a shift from a single disciplinary perspective to an interdisciplinary one. The problem raises issues fundamental to research on teacher education: (1) How do student teachers (learning to become high school teachers) bridge the gap between the discipline they studied in college and the high school subject they have to teach? (2) What is that bridge made of? and (3) How do prospective student teachers develop an interdisciplinary perspective? These questions are addressed by exploring the transformation of two anthopologists, "Cathy" and "Chris," into high school social studies teachers. It is suggested that this process involves the building of pedagogical content knowledge, which is a special amalgam of content and pedagogy and is unique to teachers and teaching. Data collected over a 12-month period consisted of transcribed interviews, observational data, and documents collected in the field. (JD)

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LEARNING TO TEACH SOCIAL STUDIES:

CASE STUDIES OF CHRIS AND CATHY

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Paper presented at the Annual Meeting of th
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Washington DC, April 1987

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Lee S. Shulman, Principal Investigator

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INTRODUCTION

> In having to communicate [content] to children I have had to organize it, in my own mind and in the different areas I was presenting. I think at the start that [my content knowledge] wasn't really organized, since I have never had to think of it in terms of how I would present it to children. (June 1985)

The person speaking is a young anthropologist who had just completed a one year teacher education program[1]. Her name is Cathy and she is describing how she had to restructure her content knowledge so that she could teach high school social studies. She found this task hard, particularly since there was very little relationship between high school social studies and the discipline of anthropology she studied in college. Cathy's problem of bridging the knowledge gap between the discipline she studied in college and the content she has to teach is representative for many social science majors learning to become social studies teachers. Moreover, social science majors have to shift from a single disciplinary perspective to a interdisciplinary one. This problem raises issues fundamental to research on teacher education: How do student teachers (learning to become high school teachers) bridge the gap between the discipline they studied in college and the high school subject they have to teach? What is that bridge made of? How do prospective student teachers develop a interdisciplinary perspective? In this paper I address these questions by exploring the transformation of two anthropologists, Cathy and Chris, into high school social studies teachers. I am going to suggests that this process involves the building of, what Shulman (1987) calls, pedagogical content knowledge. This body of knowledge is a special amalgam of content and pedagogy and is unique to teachers and teaching (Shulman 1987).

Many of the problems facing social science majors, who are learning to become social studies teachers, are represented in the struggles of those who have to bridge a knowledge gap that is particularly wide and deep. In addition, the particular problem of student teachers in social studies is that they have to adopt an interdisciplinary perspective. Anthropology majors frequently have a big task ahead of them when they begin to bridge a gap that often is both wide and deep, and they also have to shift from a single disciplinary orientation to an interdisciplinary one. The problems and successes of anthropologists should,

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[1] All names are pseudonyms.

therefore, inform us about how social science majors bridge their disciplinary knowledge and high school social studies.

Two young anthropologists learning to become teachers will show us how they began their bridge building. Cathy and Chris are anthropologists who had to bridge a gap. They have many important things in common: Their content knowledge has depth in a narrow area. They studied anthropology at the same college. They went to Greece on anthropological missions. Chris to do an ethnographic study on returning migrant workers and Cathy to explore archeological remains from classical times. They attended the same teacher education program at their alma mater university. As part of their teacher education program they taught social studies as interns at local high schools. There is, however, one major issue distinguishing Cathy and Chris, and that is their disciplinary perspective. Cathy considers herself to be an archeologist and Chris is cultural anthropologist. These different perspectives are fundamental to the way they build their bridges from what they know in their discipline and the social studies course they taught.

THEORETICAL FRAMEWORK

The analysis of Cathy's and Chris' growing pedagogical content knowledge is based on a theoretical framework that has emerged from the Knowledge Growth in Teaching research program. From this research, a conception of the knowledge base of teaching is emerging (Shulman, 1987). Pedagogical content knowledge is central to this knowledge base (Shulman 1987, Wilson, Shulman, and Richert, 1987). As the name suggests, pedagogy and content are the critical elements. Shulman describes pedagogical content knowledge as the;

> blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented, adapted to the diverse interests and abilities of learners, and presented for instruction. (Shulman 1987)

It is not unreasonable to assume that pedagogical content knowledge should draw on content knowledge and knowledge of pedagogy since college graduates who want to become high school teachers are required to have a bachelor degree in a discipline and attend a teacher education program and take courses on teaching methods and theories of learning.

First we will look at "content" in pedagogical content knowledge. Schwab, (1961/1978) has argued that within most disciplines there are several structures. This, he suggests is particularly true for the humanities and social sciences.

> First, few, if any, disciplines have a single structure. The problems of any field are usually too diverse to permit their solution by only a single pattern of enquiry. Second, the men who man the field are too diverse in their aptitudes and preferences to admit of unanimity about a one right mode of attack. Finally, even a single structure, did it exist, is not really singular. Rather, as is the case for principles as described above, a structure is a highly flexible pattern which is continually adapted and modified to fit the particular problems and situations to which it is applied. (Schwab, 1961/1978:239)

Schwab identifies basically two kinds of structures within disciplines: syntactic and substantive structures. The substantive structures are made up of the conceptual devices that are used to define, bound and analyze the subject matter they investigate. Examples in anthropology are kinship, sex roles, human evolution, and emic and etic perspectives of cultures. These kinds of structures determine what scholars in the field consider their subject matter to be about and what questions should be asked of their subject. The substantive structures often precede and determine the syntactical structures by determining what scholars consider important ideas to pursue. Furthermore, the methodology scholars use is closely tied to their ideas about the discipline. For example, anthropologists interested in human evolution will employ different syntactical structures than archeologist and cultural anthropologist.

The syntactical structures of a discipline generate new knowledge. They are

> concerned with the operations that distinguish the true, the verified, and the warranted in that discipline from the unverified and the unwarranted (Schwab, 1961).

Everyone who studies a discipline will encounter the substantive and syntactical structures of that discipline. The historian takes courses on Marxist history, political history, or social history; the anthropologist will take courses on human evolution, different courses on field methods, the ethnography, or feminist anthropology. Most people end up specializing within their discipline. Cathy has specialized in archeology and Chris in cultural anthropology. Specialization means that they studied at greater depth a few substantive and syntactic structures. This kind of specialization gives rise to different conceptions of the subject matter.

As Cathy noted at the beginning of the paper, she had to reorganize her content knowledge to make it pedagogical. Pedagogical content knowledge is a way of knowing that is different from content knowledge. Dewey (1904/1964) describes this way of knowing as the:

> Mastery of subject matter from the stand point of its educational value and use. (Dewey (1904/1964:318)

Mastery of the discipline for educational purposes involves two issues central to teaching: the reorganization of content for teaching and the teaching skills by which content is transmitted. Buchmann (1986) argues that teachers have obligations towards the discipline they teach that relate both to the organization of content and teaching methods. This means that in reorganizing content for teaching, teachers have to recognize and respect the constraints imposed by the structure of the discipline. Teachers should not replace the structure of the discipline with other structures that are alien to it (Schwab, 1961/1978).

While "content" in pedagogical content knowledge refers to the organization of the subject matter, "pedagogical" refers to the skills regarding the transmission of content knowledge organized for teaching. Since students have bachelor degrees in a discipline, they bring most of their content knowledge to the teacher education program, but pedagogical knowledge has primarily to be learned in the teacher education program. It is important to note that students have pedagogical knowledge from being students in K-12 plus four years in college (Lortie, 1975). This knowledge, however, is different in nature from the pedagogical knowledge students learn in college. There, students explicitly examine teaching methods with their own teaching in mind.

Student teachers not just learn specific methods in their teacher education program. They also learn to acquire a vision of what are acceptable teaching method in terms of their goals for teaching and conception of the subject matter (Ball and Nordhoff, 1985; Grossman and Richert, 1986).

The teaching methods we use and the learning approach we promote are an integral part of knowledge (Schwab 1961/1978). Three kinds of skills that are important in teaching the disciplines if the approach is not to be alien to the structure of the discipline. Schwab explains those three skills.

> First ... are the skills by which one applies the truths learned from a discipline. Second, there are the skills of enquiry itself. In their primary use, these are the skills by which the master of a discipline

> contributes new knowledge to that discipline. But secondarily, they are the skills by which secondary enquiry (enquiry into enquiry) is conducted. By "enquiry into enquiries" I mean the kind of study which is involved in an "inductive" approach to the structure of a discipline, learning the structure by study of instances of it. ... [T]hese are the skills which lead to critical understanding of knowledge.
>
> Third, there are the skills of reading and interpretation by which one discovers the meanings of statements which are embedded in a context of structure. (Schwab, 1961/1974:236-237)

According to Schwab, the first skill is employed by researchers in the discipline and along with the second skill, these are usually called "application of principle" and "interpretation of data." These are the skills that lead to a critical understanding of knowledge and an understanding of the process by which scholars come to their conclusions. The third skill refers to discovering structure in the text, and is less common in education.

Schwab, thus gives us a vision of the ideal in terms of teaching a discipline. But, it remains to be seen if Cathy and Chris realize it and are able put it into practice.

METHODOLOGY

The data for this study consist of transcribed interviews, observational data, and documents collected in the field. Data collection covered a period of 12 months, or the duration of the teacher education program Chris and Cathy participated in during the 1984-1985 academic year. Cathy and Chris were selected from a group of volunteers in a teacher education program in Northern California and they are two of 21 subjects in The Knowledge Growth in Teaching research project currently in progress. They were interviewed 7 times in 1 1/2 to 2 hour interviews and participated in planning cycles (Cathy in 4 and Chris in 6). The planning cycles consisted of a pre-observation interview, observation, and post-observation interview.

The interviews focused on their conception of the subject matter, the course they were teaching, the students, pedagogy, and a standardized stimulus exercise. In the planning cycle the pre-observational interview focused on the topic the student was going to teach, how it related to the discipline at large, how it fitted in with the course they were teaching, the pedagogical strategies they were considering, and the kinds of explanation

and demonstrations they were going to use. The post observation interview focused on what had happened during the observation in relation to the pre-observation interview. This interview usually took place right after the observation period.

Initial data analysis consisted of writing summaries from interviews and interview/observation cycles. All data was then coded using the theoretical emerging from the project as major coding categories. Next, we will look at Cathy and Chris and what they learned during their year of teacher education.

CASES

Cathy selected her undergraduate courses with her archeological perspective in mind. Her areas of expertise are the methodological and scientific aspects of archeology, and ancient Greece. She spent one summer in Greece touring archeological sites with several students from her college and a couple of professors. Her interest in field methods is also evident in less exotic places. One of her favorite college courses was working on a local ancient Indian site, digging and shifting mud looking for artifacts from the past. This heavy emphasis on archeology and archeological research methodology has given Cathy an educational background that has depth rather than breadth.

The archeological background is evident in the map Cathy drew of anthropology at the beginning of fieldwork (see figure 1). Archeology is the foundation of anthropology in the form of her question "how we got here." Her map shows the other major areas of anthropology: social anthropology, cultural anthropology and Paleoanthropology. Cathy never liked cultural anthropology which her college anthropology department is particularly well known for. She prefers the "mystery" and "challenge" involved in discovering objects and hypothesizing about them, an activity she can pursue under the umbrella of archeology. She has adopted the etic perspective of the archeologist, a perspective that seeks to account for phenomena in terms of scientific and theoretical categories.

> I like finding the objects that have been buried... If you study someone nowadays, you have to interact with them. Sure, they have artifacts, but [in cultural anthropology] you are focusing on what these people are doing now, how they are interacting now. You are more involved in the present day situation then what happened before. (July, 1984)

One of her most memorable experiences from college was a simulation activity where students were given artifacts as one

would find in a site and a map of a house, and they were to generate ideas about the culture and the family that lived there. The students had to hypothesize and develop their own ideas.

The course Cathy is teaching is freshman social studies. The official title is "Geography and Cultural Anthropology," but Cathy calls it "World Cultures" and teaches it as such. She follows the textbook that begins with a unit on geography and then moves to different cultures and regions of the world.

> I think of this course in small pieces... region by region. They are different and what you can hope is to tie certain things together. (October, 1984)

Geography is the starting point for each region because "[the students] have got to know where the place is" (June, 1985). Cathy emphasizes the causal relationships of geography as is exemplified in the unit she taught on Japan. After doing some physical geography and pointing out lack of land and natural resources, Cathy moved to industrialization in Japan. She asked: why did they become industrialized? Students were invited to draw on the work they had just completed in physical geography to explore the answers. From industrialization they moved to culture and those aspects of Japanese culture that Cathy thought were unique: family, writing, haiku poetry and negative space in Japanese painting. To Cathy, Japan with its industrial might and exotic culture sits firmly on the land.

Geography does not appear on the map of anthropology that Cathy drew and explained at the beginning of the year. It is a new interest and a new knowledge area that is the result of having to teach content she is knew very little about. Cathy's emphasis on geography is perhaps not surprising given her strong interest in artifacts of the past buried in the ground. Her new interest in geography and old interest in archeology join in a unit she taught on the Bushmen of the Kalahari desert. This unit followed one on the physical geography of South Africa. She told students about the Bushmen, describing the place they lived and their lifestyle. She then gave them a map of a site where Bushmen had lived and a list of artifacts found. With this exercise, she tried out with her class an activity from one of her favorite college classes.

The teacher education program Cathy is enrolled in has literally pulled the archeologist from the past and planted her firmly on the ground in the present. The message from her curriculum and instruction class is that current events are important and should be included in the curriculum. "Get them their civics" is the professor's message that is echoed by her teaching practice supervisor. Cathy's aim is to make students aware of what is going on in the world around them.

> You have got to inform them, to tell them what is happening out there in the world. I can't force them to read, or care, or any of that. I can present them with ideas, or issues, that they might never have heard of... How many of them knew what was going on in South Africa? They would probably have figured out it was just another Black country. (June 1985)

The message about the importance of current events was forceful enough for Cathy to abandon her usual geography introduction to a new unit and start with a current event. As she was getting ready for the unit on Russia, Chernenko died. Encouraged by her supervisor, she started the unit with this event but quickly got around to geography and the tundra of Siberia. She found the current event approach useful and relevant, but she was more comfortable with her "feet on the ground," that is, geography.

During the first months of her teacher education program, before she started her internship, Cathy and the other social studies students assisted an experienced social studies teacher teaching at the Upward Bound program at her college. This teacher gave Cathy and Chris a powerful role model in the use of current events in the social studies curriculum. The experienced teacher taught a unit on South Africa that both Cathy and Chris repeated, in their own way. Cathy emphasized the logics of the system and how it operated. She found that the students had difficulty "understanding the legality of segregation between blacks and whites and coloreds" (January 1985),

During her year of student teaching Cathy has been trying to make up for her lack of knowledge on current events. She is reading the newspapers and news magazines.

> I don't have any real current knowledge. It is not in my background. I have to learn it myself because I have a base to work from now because of [my teaching experience in Upward Bound]. (October 1984)

Cathy drew a map of her discipline at the end of the one year of teacher education. The map shows changes in the way she viewed anthropology, she has added another layer underneath archeology (see figure 2). Geography is now the foundation for anthropology and archeology. Anthropology now has three distinctive categories: political structures, economic structures and social structures. Out of these three basic categories branch out current event categories. She explains that this map is "neater" and the categories hold more information and ideas. The old map was, in her words, "rough" and in the new map she has

"added structure to it that shows how things are related" (June 1985).

Cathy's fellow student teacher is Chris. He also had to learn new knowledge and re-structure the old one. Next, we will turn to the case study of Chris.

Chris is an anthropologist who's areas of expertise are cultural anthropology and human evolution. His special interests within anthropology are anthropological research methods, like those used by cultural anthropologists and researchers investigating human evolution. In addition to the ethnographic work in Greece, Chris also worked as a research assistant to professors investigating human evolution. Both these research experiences have been important influences on his conception of anthropology.

Chris also drew a map of his discipline at the beginning of fieldwork. Being an experienced field worker himself, he had strong views on different methodological approaches, and drawing maps was one of them. He didn't like it, so he only made one at the beginning of fieldwork (see figure 3). On this map, we can see that he has biology and evolution at the base and above it human evolution interacting with language and culture. Then growing from this base comes homo sapiens, literature, cultural anthropology and ethnography.

Chris comes to his teacher education program with an education that has depth rather than breadth. He is knowledgeable within his areas of specialization in anthropology: human evolution and cultural anthropology, but less so in history and geography, which are the two other major content areas in the social studies course he is teaching. Chris knows that his content knowledge is not suitable for teaching high school students. Early in the teacher education program, Chris encountered this problem when he wanted to teach students about human evolution.

> What I have to work on is how to explain human evolution because these are really difficult concepts. I might do some reading to get some good examples because the examples I know won't fit in the class. The examples have to be appealing and accessible. I don't think I'm going to come in and talk about different explanations and environmental influences. That would not go and I have to redefine it somehow. That is what I have to figure out--what are good examples. (October 1984)

At this early stage in his teacher education program, redefining the subject matter for Chris is coming up with better examples, which is not redefining. It seems that he is searching his content knowledge for examples that his knowledge of students tells him will work with the class. One year later Chris has come a long way, because now he redefines the subject matter and comes up with the idea of a story as a means of redefining the subject matter.

> A good unit needs a story, or a theme. It could have a hierarchy of themes, or some network of themes, or webs, to get into Geertz' vocabulary. A bad unit doesn't really have a story or something to draw it together and who why it is important. The story, that is the gist--what it is all about. (October 1984)

Chris is here talking about a story for one unit. In his case, it is usually the unit coming next. He is not able to come up with a story for the whole course. He has some ideas about the course being about Man.

Chris is working on coming up with his stories and he gets help from the teacher education program. In one of his teacher education classes, Chris came across Schwab's (1961/1978) idea of the syntactical and substantive structures of the disciplines. The idea of substantive structures made Chris think about cultural anthropology and human evolution in terms of different conceptions of anthropology and influenced the stories he came up with for the units. Chris uses the substantive structures of anthropology to come up with stories, and he uses ideas from the curriculum class to structure the stories into units to teach. Consequently, when he teaches topics that are outside anthropology, he cannot turn to the discipline for stories. So, he does not come up with one. In the non-anthropology units, Chris lets the textbook take over, or gets a good movie on the topic. It is hard work turning a whole course of study into cultural anthropology and human evolution, and Chris does not have the time and energy to do so all the time. He works hard at coming up with a story in the units that have anthropological elements. He works on one unit at a time without forging explicit connection from one unit to another or the course of study as a whole.

If the substantive structures help Chris come up with the stories, then the syntactic structures help him finding effective ways of telling them. The syntactic structures of anthropology are evident in classroom activities. He simulated the ethnographic interview with his class where he played an informant and students were to be anthropologists, he also taught the theory of evolution by using skulls as evidence for the

theory. The ways of the anthropologist as a researcher making sense of data permeate all activities Chris has the students engage in. He likes to give them materials that resemble the kinds of experiences anthropologists have doing field work. He shows them movies and pictures of exotic cultures and has the students reacting as anthropologists.

> We showed them the movies and I got into the idea of "what is this telling you? Describe what happens during "gard." Describe what happens during a Dani battle. Describe what they are doing." I have been asking a lot of descriptive questions. (January 1985)

Presenting the emic view of cultures is of central interest to the cultural anthropologist. Chris has presented to his class cultures that look at the world in a way that is fundamentally different from his students. He tried to present the East German's rationale for building the Wall and their view of the West. He taught a unit on South Africa and Apartheid where he tried to present the Afrikaners point of view. He discovered that seeing Apartheid as "normal" was hard for Californian teenagers.

> I showed them a movie called "The Afrikaner Experience" to get some of the ideas of why the Afrikaners are like they are and why they have set up this system and how they feel themselves surrounded. It was a difficult movie. Some of these ideas came across and it is really hard for these kids to see the other point of view. It is so emotionally loaded. It is not like watching the Nuere washing their hands in cow piss. That is easy to deal with. But the Afrikaners, why they have installed this system, that is hard. (February 1985)

Chris' progress in coming up with, structuring, and telling stories has been facilitated by his growing pedagogical knowledge and knowledge of students. He selectively draws on his teacher education classes to construct this new way of knowing. There is evidence that he uses ideas from the teacher education program about curriculum, teaching methods, theories of learning, and sociology of knowledge. It looks as if Chris is building up his pedagogical content knowledge out of necessity, for he soon found out that he could not use the pedagogical approach he was used to as a college student, the lecture method. His students would not listen to a lecture for more than 5 minutes, so he had to figure out ways to get the students engaged in learning.

DISCUSSION

Cathy's disciplinary perspective has given her a framework for approaching the integration of new content with old. She has had to learn a great deal of new content that gets organized along the lines of her disciplinary knowledge. This is evident from the questions that guide her work. She asks the kinds of questions of the subject she teaches that she would ask of the orientation to anthropology she feels most comfortable within. She treats Japan as she would digging for artifacts on an ancient site. Cathy approaches her teaching from the ground with geography, and she treats the rest of the curriculum in a causal/effect relationship: The economy and culture of Japan are the result of the Japanese having very little land and natural resources.

The teacher education program is an important influence in Cathy's disciplinary shift. She is learning to look at current events, a kind of interdisciplinary knowledge that does not come in neat archeological categories. She realizes their importance in social studies but she is clearly uncomfortable working within an interdisciplinary perspective. The one year experience in the teacher education program has to some extent changed her map of the discipline of anthropology. We now have a new content area, geography, but the rest is basically the same. The major emphasis of the teacher education program, current events, does not appear. It is possible to speculate that Cathy was prepared to change her map of anthropology if it did not cause too drastic changes. Geography was just another layer under archeology, supporting it and perhaps giving it a richer flavor. Current events, on the other hand, would have demanded more drastic changes, and as we can observe in her second map, she is not prepared to make those changes.

Then, how does Cathy build her bridges and what are they made of? She does add new content to her knowledge base, she tells us she is reading news magazines, but she has organized the new material along the lines of her disciplinary orientation. For example, she brings her distinctive etic approach to apartheid. All bridges have beams that carry the weight, also Cathy's bridges. It is possible to say that the beams, carrying the weight of the structure in her bridges between her disciplinary orientation (archeology) and high school social studies, are made of the key concepts from archeology. The rest of the building materials needed for the bridges are new content that she attaches to the beams, or the archeological concepts. When the new knowledge does not fit the disciplinary perspective, it gets a quick treatment, like Chernenko's death, and does not make a lasting impact.

This one year of teaching has left Cathy with the beginnings of pedagogical content knowledge that still looks very much like

her content knowledge. She has begun the reorganization of content, in a very small and careful way by adding one layer under the foundation. The teaching methods she employs support this suggestion. They are more true to the discipline of anthropology than interdisciplinary social studies. In the context of the modest reorganization of content that has taken place, it is not really surprising. Cathy is still doing archeology.

Chris' disciplinary knowledge is his starting point, as we can seen from his words at the beginning of the year. He searches his content knowledge for better examples without trying to restructure it. When he begins to restructure his content knowledge his focus is on the emic perspective of the cultural anthropology, it is a restructuring of content to make it pedagogical, but it is still a singular disciplinary perspective.

The disciplinary perspective influences how new knowledge gets integrated with the old. South Africa and apartheid were labelled "current events" by Chris and are new knowledge to him. However, we see that he turns it into something more anthropological since he approaches this event as a cultural anthropologist who wants students to see apartheid as "normal" for the Afrikaners.

Chris is actively engaged in restructuring his content knowledge to make it "teachable." He is trying to come up with "stories" as a way of restructuring his anthropological content knowledge to make it accessible for students. His content knowledge has another important function: It is important to him and gives him a sense of passion for the field and a sense of purpose for teaching unmotivated freshmen. Chris' content knowledge in cultural anthropology is the most important source for the most exciting topics to teach and the most effective teaching method in terms of keeping the students active and engaged in learning.

The process of restructuring content knowledge is facilitated by the teacher education program. There he gets the ideas that help him clarify his views and restructure content knowledge. Schwab's ideas help him realize the potential of cultural anthropology for high school students. However, while he is actively restructuring content, he is not bringing in another disciplinary perspective. He is doing cultural anthropology.

The comparison of Chris and Cathy shows that the role of content knowledge is critical in the development of pedagogical content knowledge. It seems that it gets restructured to become the content in pedagogical content knowledge. The role of disciplinary perspective is important for both of them, in particular when it comes to adding new content. The unit on

South Africa that both of them taught was presented to them, by the experienced teacher, as current events and accepted as such by both of them. Current events are by nature interdisciplinary. However, when Cathy and Chris taught it to their own class, they did so from the disciplinary perspective they knew best. Therefore, it seems that when Cathy and Chris add new knowledge to their growing pedagogical knowledge, it becomes strongly flavored by the disciplinary perspective they are working within. It is relevant here that apartheid is a kind of current event that can be approached from different perspectives and the perspective from which Cathy and Chris are organizing their curriculum is particularly relevant for this important topic.

It seems that Cathy and Chris are only able to do one thing at the time. Now they are restructuring their content knowledge to make it pedagogical, and developing pedagogical skills that effectively communicate to students what they feel is important in the discipline. Both of these do not require too many excursions outside of the discipline. Developing an interdisciplinary perspective requires new knowledge that they do not have. It is worth remembering that both Cathy and Chris claim that their content knowledge is deep and narrow. An interdisciplinary knowledge requires a different kind of knowledge, one that has some breadth.

The "pedagogical" in their developing pedagogical content knowledge seems, at least partly, to be drawn from the syntactical structures of the discipline. Therefore, we have Chris and Cathy proceeding in their year of student teaching with a single disciplinary perspective teaching an interdisciplinary subject.

The bridge building for both Cathy and Chris proceeds in a similar manner: it is based on the disciplinary perspective they know best and prefer. They seem to be effective in communicating to students the knowledge they know well and have strong feelings about. Some new knowledge gets integrated into this framework. It is important to note that not all the new knowledge they encountered in their teaching program gets integrated. Both learned a great deal of new knowledge in the textbook they used and from the experienced teachers who were their master teachers. This knowledge does not get integrated with old knowledge in the manner of the unit on apartheid. The reason may well be that they were exposed to the apartheid unit at the beginning of the teacher education program before the pressures of being responsible for a class build up.

CONCLUSION

These case studies of Cathy and Chris show us, first of all, that content knowledge is central to learning to teach. Cathy and Chris extensively draw on their content knowledge in teaching as they proceed to restructuring it to make it "teachable." As Lanier (1986) points out, the implication of this is that teacher education begins long before a student enters a teacher education program. In the case of Cathy and Chris, it began with their anthropology professors who's primary concerns are the maintenance of the discipline, not pedagogy. Therefore, they have practically on their own to restructure this content to make it pedagogical.

Secondly, the teacher education program does influence the development of pedagogical content knowledge. In social studies this influence is limited to the content knowledge students bring to the program. New knowledge does not seem to become part of the growing pedagogical content knowledge, yet. It seems as if the content knowledge students bring to the teacher education program has to be re-structured to make it pedagogical. For an interdisciplinary perspective to develop, the student teachers appear to need more than re-structured content knowledge, they also need knowledge in areas outside their disciplinary perspective. As it stands, neither of them are teaching from an interdisciplinary perspective.

And finally, these case studies show that the teacher education of Chris and Cathy has only just started. They have still a long way to go in terms of restructuring the content they know, developing the relevant pedagogical skills, and acquiring an interdisciplinary perspective. The bridges they are building are currently only made of building materials from their discipline. Perhaps, as Chris and Cathy become more experienced they will replace these bridges that are built with their discipline with others made of building materials from a wider range of sources.

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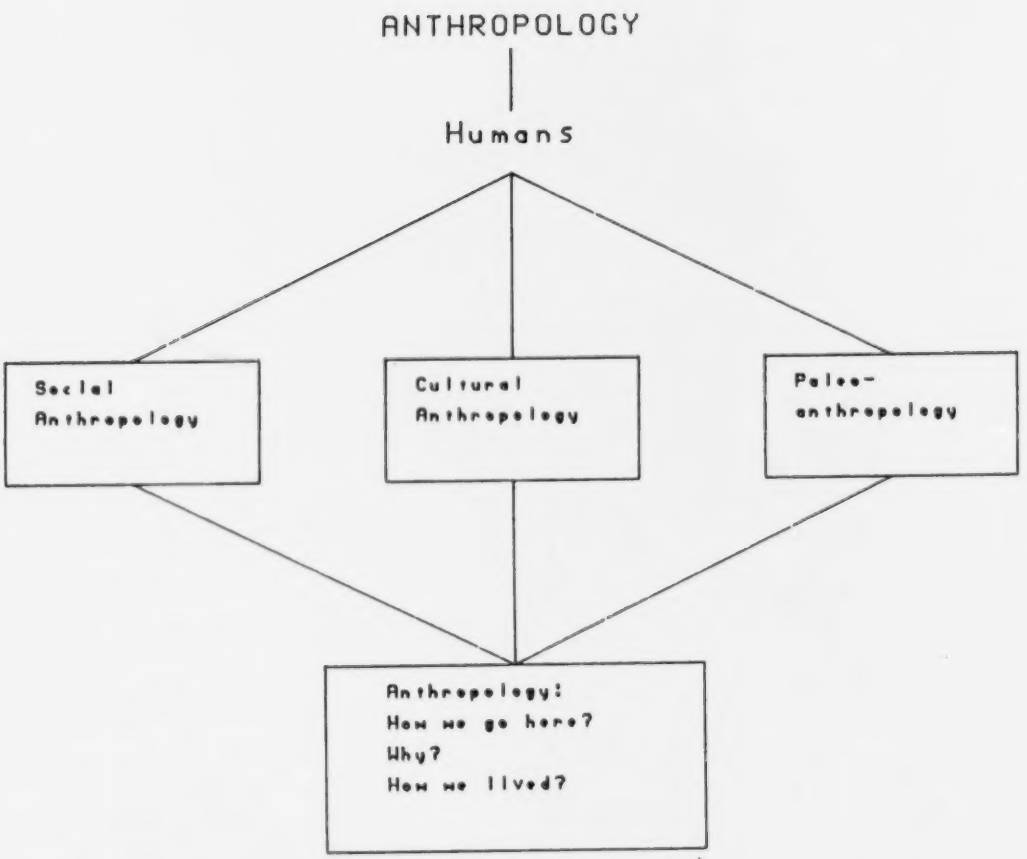

Figure 1 - Cathy's first map of the discipline.

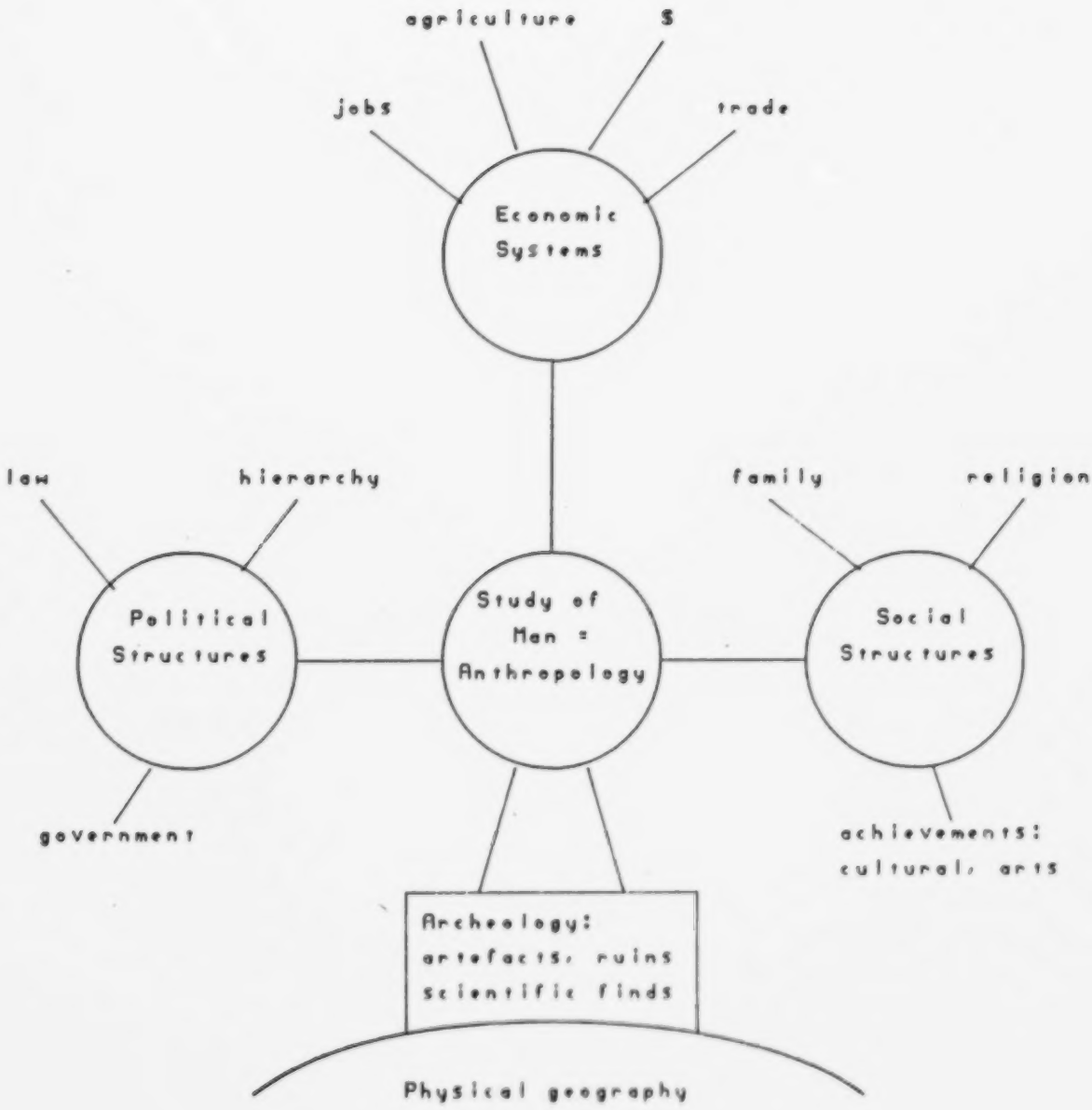

Figure 2 - Cathy's second map of the discipline.

Figure 3 - Chirs'map of the disciplines.